U.S. EPA Comments:
Technical Support Document: Derivation of Human Health Criteria and Risk Assessment
Draft February 2013. Florida Dept. Environmental Protection (DEP)
February 27, 2013

Shrimp Apportionment and Depuration

- EPA considers shrimp to be an estuarine species based on location during the majority of its development and lifespan. Because of this, harvest location is not relevant to the apportionment for the fish consumption rate.
- There is insufficient rationale for excluding BCF values less than 300 for shrimp caught offshore. The argument that lower BCF chemicals would be depurated in the marine environment makes an unsupported assumption that there would be zero residues of those chemicals. It also ignores shrimp life history where adults may have a significant residence time in estuarine waters.
- The TSD also has several statements and assumptions regarding shrimp bioaccumulation that require reconsideration:
    - The Ong et al. (2011) study was a feeding study with anthracene, and the stated low uptake rate is specific to food, not accumulation from water. The TSD should be clear when discussing food chain vs. water only exposures.
    - The Snyder and Karouna-Renier (2009) study does not appear to state that "shrimp tend to not concentrate pollutants" (p. 13 TSD). The accuracy of this statement should be verified.
    - Cox and Anderson (1974) is only referenced for rapid depuration in large shrimp, whereas the report abstract shows rapid uptake of naphthalenes and slow depuration (25-33 days) in small shrimp.
    - Kobayaski et al. assumes that depuration will occur in clean water free from any pollutants. This assumption does not account for natural conditions.
    - Several of the citations were either improperly cited or could not be readily accessed (e.g., Gibson et al., 1979 vs. 1981; Kobayashi et al., 1990).

Lipid Content Distribution

- Lipid content is tied to bioconcentration for specific trophic levels of fish species. The fish species utilized in the lipid distribution for Florida fish does not correlate with the species in the national data used for the FCR in this TSD. EPA feels that it is not accurate to assume that the lipid distribution is the same in these two cases. The lipid content distribution should not be tied to the overarching goal of the human health ambient water quality criteria that a state's residents should be able to consume their entire FCR from local waters, but to the FCR and BCFs utilized in developing the criteria themselves.
- EPA recommends that in a probabilistic simulation, the lipid content cannot be independent of the correlating individual fish species or trophic level summations.
- The recommended default lipid values described in the 2000 Methodology are based on national fish patterns of consumption and correlate with the use of a FCR based on national data. Due to the lack of sufficient data in the 2011 Exposure Factors Handbook on NHANES data, the trophic levels for FCR are not able to be parsed apart. In this case EPA recommends using the default lipid value of 3% for trophic level 4 species.

Body Weight Correlation with Fish Consumption Rate

- On PDF page 29 of the TSD, it is stated that "the distribution developed by EPA [for fish consumption] is based on the whole population and is expressed on a grams per kilogram body weight per day basis. FDEP used a simple Monte Carlo simulation to convert the distribution into grams per day based on the distribution representative of the adult population."
- EPA assumes that based on this description and the description on PDF page 20 where the probabilistic inputs are described, that the body weight input used to convert the FCR distribution into g/day from g/kg·day is not correlated with the body weight input used in the calculation of the criteria. EPA feels that this is inappropriate and that the BW used in both the conversion and in the individual iterations of the Monte Carlo simulations for the criteria development should utilize the same BW in each iteration.

Hazard Quotient and Criteria Derivation

- On PDF pages 12 and 16 of the TSD, the calculation of the hazard quotient (HQ) is described. EPA feels that the written description of the formula is not clear and that neither the description of the formula nor the formula itself indicate the use of a relative source contribution. It is the opinion of the EPA that the HQ should reflect the portion of the reference dose allocated to the known exposures (fish consumption and water intake) in the criteria formula for non-carcinogens.
- EPA finds merit in the idea of using an HQ as a risk management tool in order to assure protection of the 90th percentile of the population. EPA does not agree with the approach taken in the TSD which randomly assigns ranges for the criterion inputs for each pollutant criteria. This methodology truncates the population parameters and fails to account for the full range of population characteristics and exposure behaviors.
- This approach may be appropriate for site specific risk management decisions choosing the exposure input distributions pollutant by pollutant. However, the current revision activity targets revisions for the entire state, not on a waterbody by waterbody basis. EPA recommends that the approach follow the overall goal of the ambient water quality criteria, with uniform exposure assumptions for all contaminants. This requires using a single exposure distribution and critical exposure point for all contaminants. The approach as developed fails to provide the same level of protection for each chemical when the criteria inputs are varied among pollutants. If one pollutant attains an HQ of 1 using a truncated distribution of exposure inputs (i.e. fish consumption and water intake) and water bodies are protected using that distribution, then they would not necessarily protect the population against exposure to a second chemical that would need a broader range on exposure inputs to also attain an HQ of 1. Standard input distributions are needed for all pollutant criteria derivations in order to ensure consistent protection among pollutants in all waterbodies.

Additional Comments

- TSD PDF p. 30- "Under this approach, all shrimp consumed were considered to be from estuarine waters for parameters with BCF values greater than 300, while for compounds with BCF values less than **3000**, a portion of the shrimp consumption was re-apportioned to the marine habitat." Should the bolded number in this quoted line read '300' and not '3000'?
- The page numbers throughout the document need to be corrected/adjusted.
- CAS Numbers should be listed with pollutants in all sections of the document.
- TSD PDF p. 40- "Table **2-3** summarizes the fresh and estuarine, marine, and all fish consumption distribution for the CSFII survey as analyzed by EPA (2002A). The reported average consumption rate of freshwater and estuarine species was **17.5** g/day of which 14.3% can be assumed to be

marine shrimp. A re-apportioned freshwater estuarine mean consumption rate was calculated by multiplying the reported average consumption rate by the shrimp adjustment factor (**17.5** g/day x 0.843 = 6.32 g/day)." Is this passage referencing table 2-5, not 2-3, located on PDF p. 35-36? If so, Table 2-5 refers to a mean daily consumption of 7.5 g/day of freshwater and estuarine fish, not 17.5 g/day.

- TSD PDF p. 61- Florida DEP is proposing rounding all draft criteria to 2 significant figures. EPA recommends following appropriate scientific rounding as described in section 2.7.3 in the 2000 Methodology.
- Appendix C in the TSD should list the source documents for the information presented.